FIG. 1

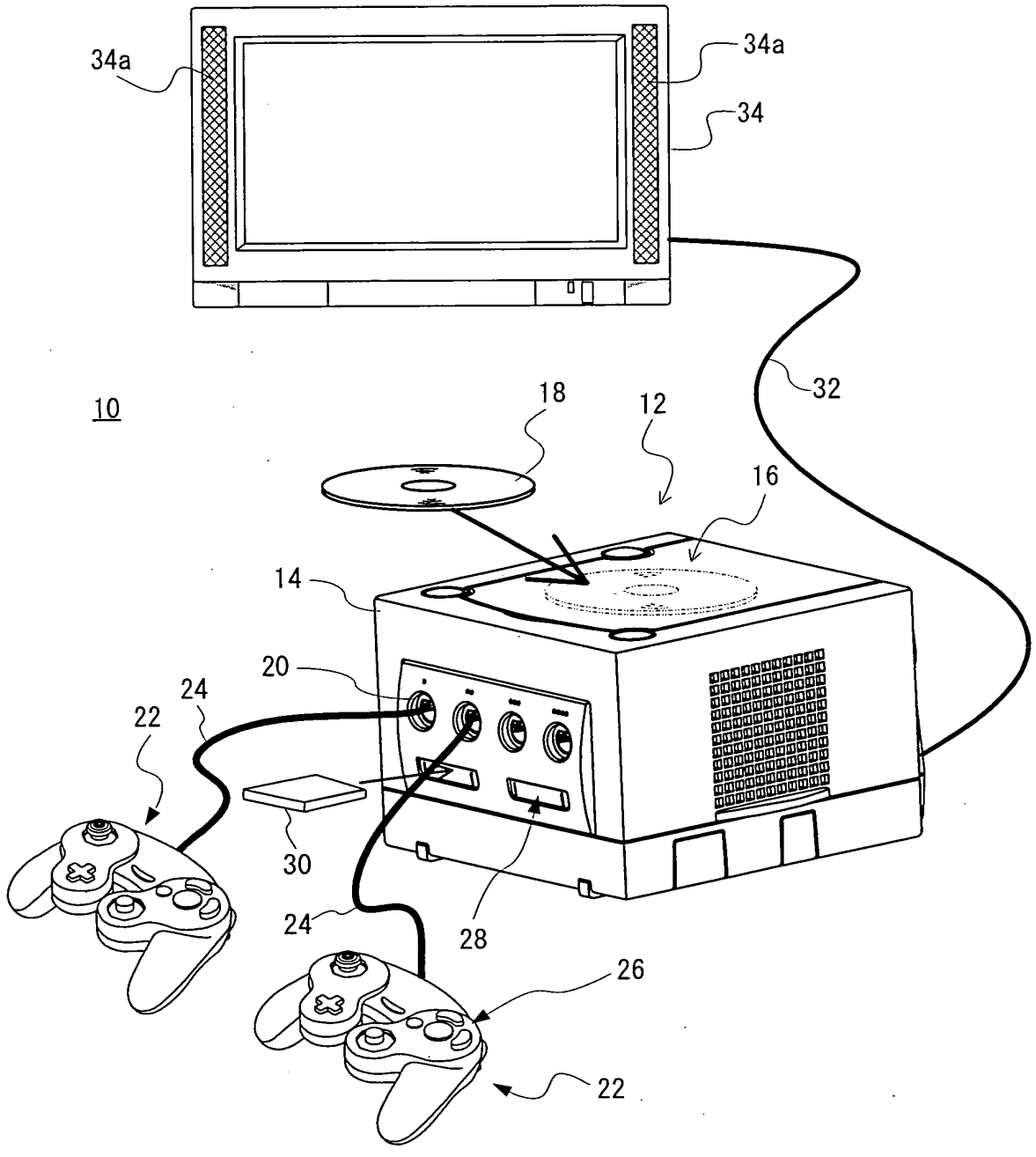


FIG. 2

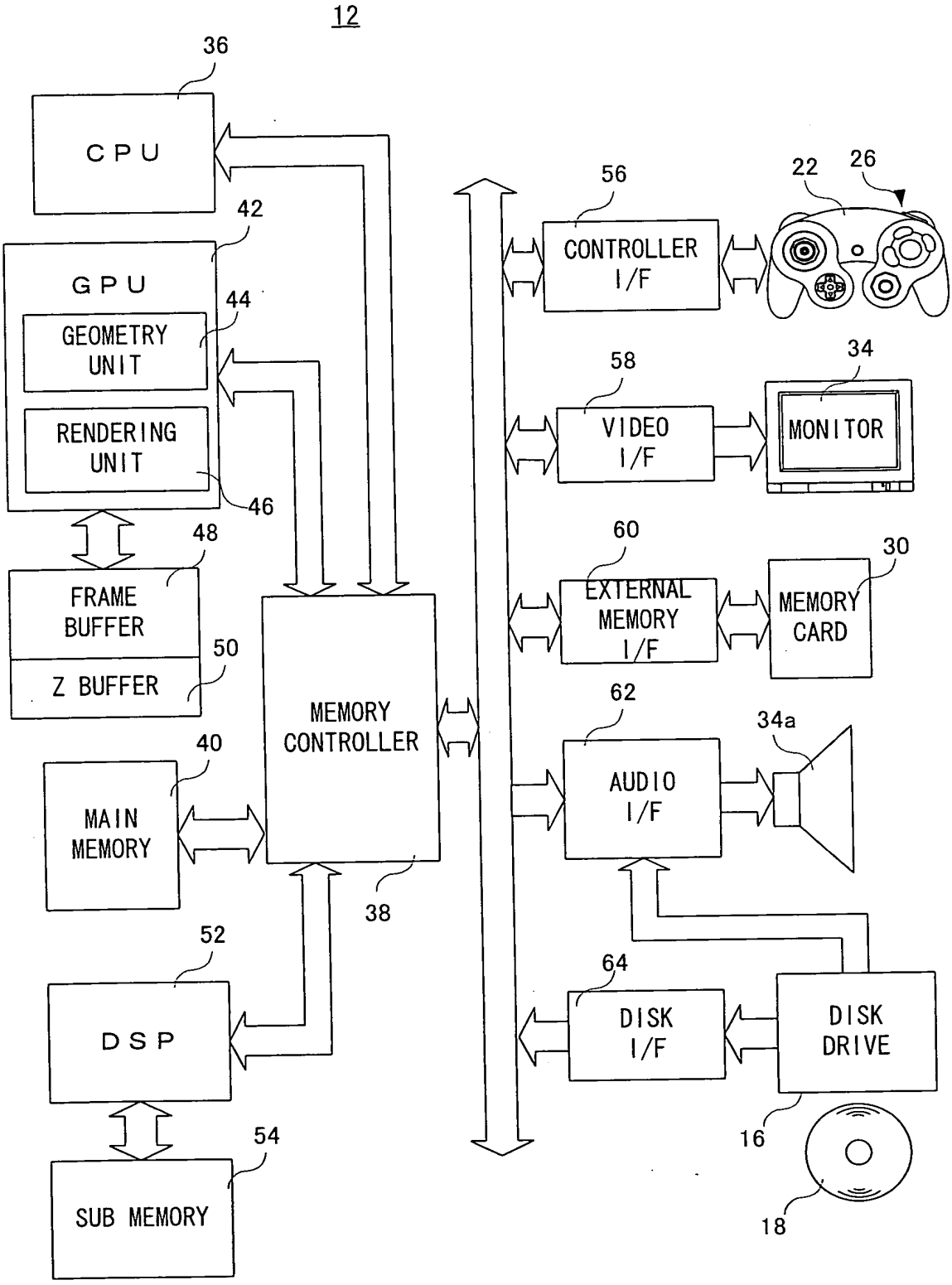

12
36
CPU
42
GPU
44
GEOMETRY UNIT
RENDERING UNIT
46
48
FRAME BUFFER
50
Z BUFFER
40
MAIN MEMORY
MEMORY CONTROLLER
38
52
DSP
54
SUB MEMORY
56
CONTROLLER I/F
22
26
58
VIDEO I/F
34
MONITOR
60
EXTERNAL MEMORY I/F
30
MEMORY CARD
62
AUDIO I/F
34a
64
DISK I/F
DISK DRIVE
16
18

FIG. 3

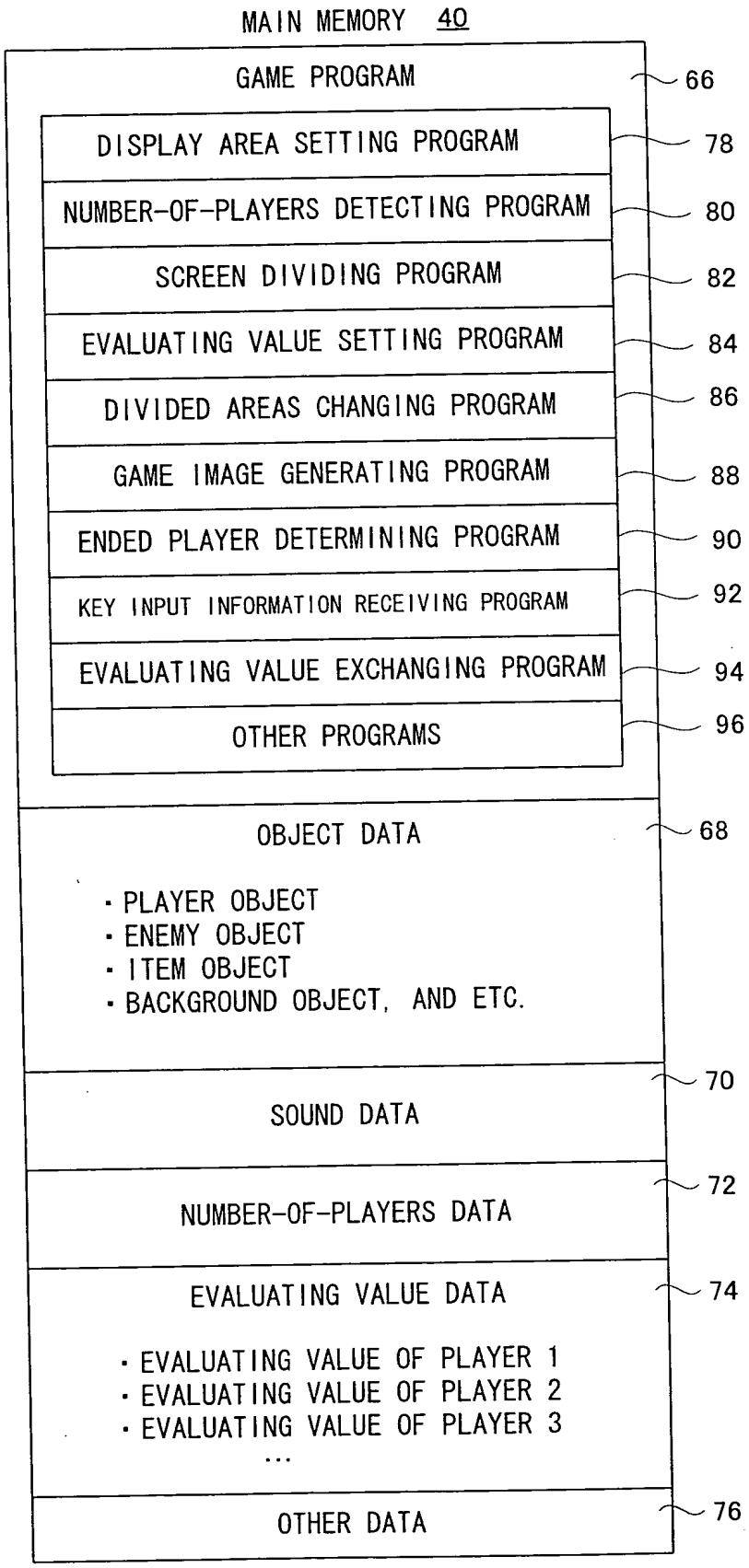
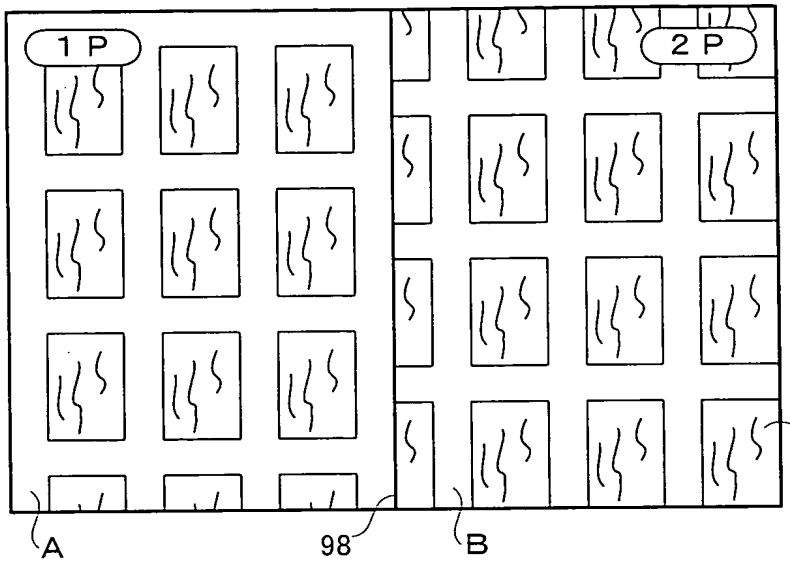

MAIN MEMORY 40
GAME PROGRAM
66
DISPLAY AREA SETTING PROGRAM
78
NUMBER-OF-PLAYERS DETECTING PROGRAM
80
SCREEN DIVIDING PROGRAM
82
EVALUATING VALUE SETTING PROGRAM
84
DIVIDED AREAS CHANGING PROGRAM
86
GAME IMAGE GENERATING PROGRAM
88
ENDED PLAYER DETERMINING PROGRAM
90
KEY INPUT INFORMATION RECEIVING PROGRAM
92
EVALUATING VALUE EXCHANGING PROGRAM
94
OTHER PROGRAMS
96
OBJECT DATA
68
・PLAYER OBJECT
・ENEMY OBJECT
・ITEM OBJECT
・BACKGROUND OBJECT, AND ETC.
SOUND DATA
70
NUMBER-OF-PLAYERS DATA
72
EVALUATING VALUE DATA
74
・EVALUATING VALUE OF PLAYER 1
・EVALUATING VALUE OF PLAYER 2
・EVALUATING VALUE OF PLAYER 3
...
OTHER DATA
76

FIG. 4

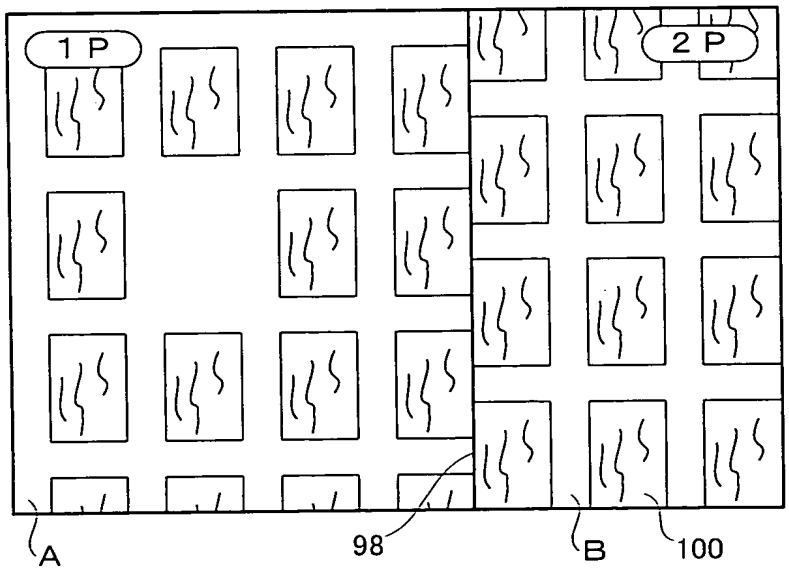
AT A TIME OF STARTING GAME (IN CASE OF 2-PERSON PLAY)



- AREA OF DISPLAY AREA = 180
- EVALUATING VALUE OF PLAYERS (1, 2) = 1
- AREA OF DIVIDED AREAS OF PLAYERS (1, 2) = (1/2) × 180 = 90

FIG. 5

WHEN PLAYER 1 TAKES CARD



- AREA OF DISPLAY AREA = 180
- EVALUATING VALUE OF PLAYER 1 = 1.5
- EVALUATING VALUE OF PLAYER 2 = 1
- AREA OF DIVIDED AREA OF PLAYER 1 = (1.5/2.5) × 180 = 108
- AREA OF DIVIDED AREA OF PLAYER 2 = (1/2.5) × 180 = 72

FIG. 6

STATE IN WHICH PLAYER 1 FACILITATES THE GAME ADVANTAGEOUSLY

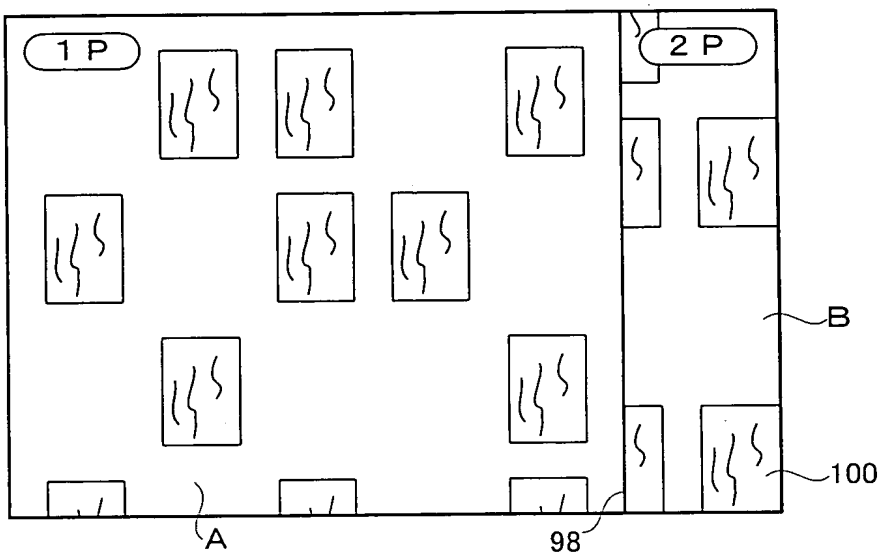
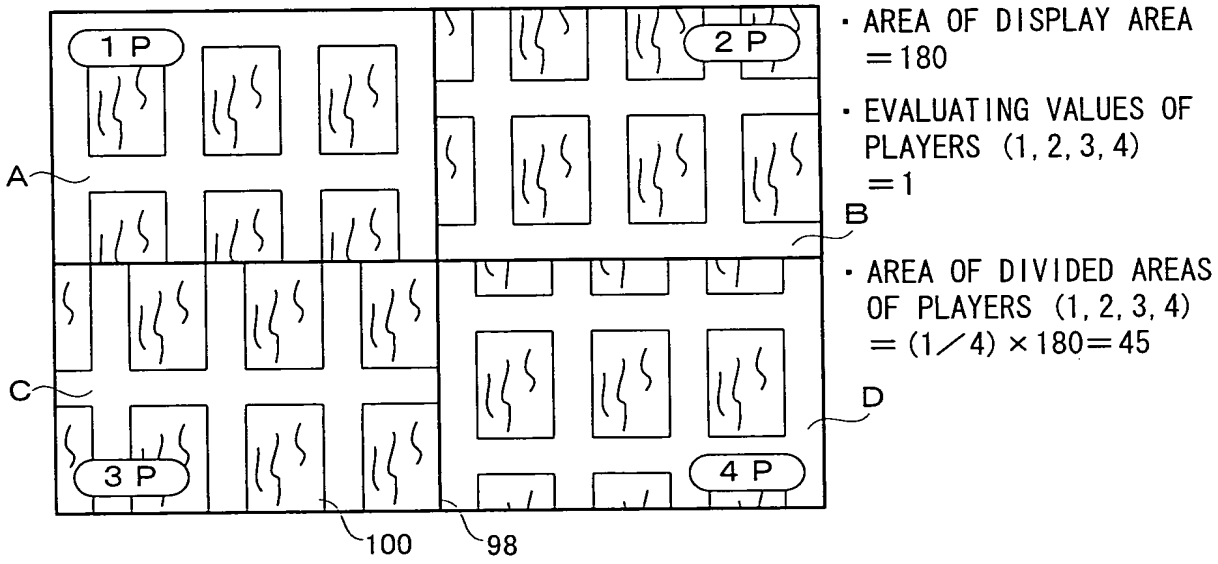


FIG. 7

AT A TIME OF STARTING GAME (IN CASE OF 4-PERSON PLAY)



Inventor: SHIMIZU
SN Unknown/Sheet 6 of 20
Atty. Dkt.: 723-1464

FIG. 8

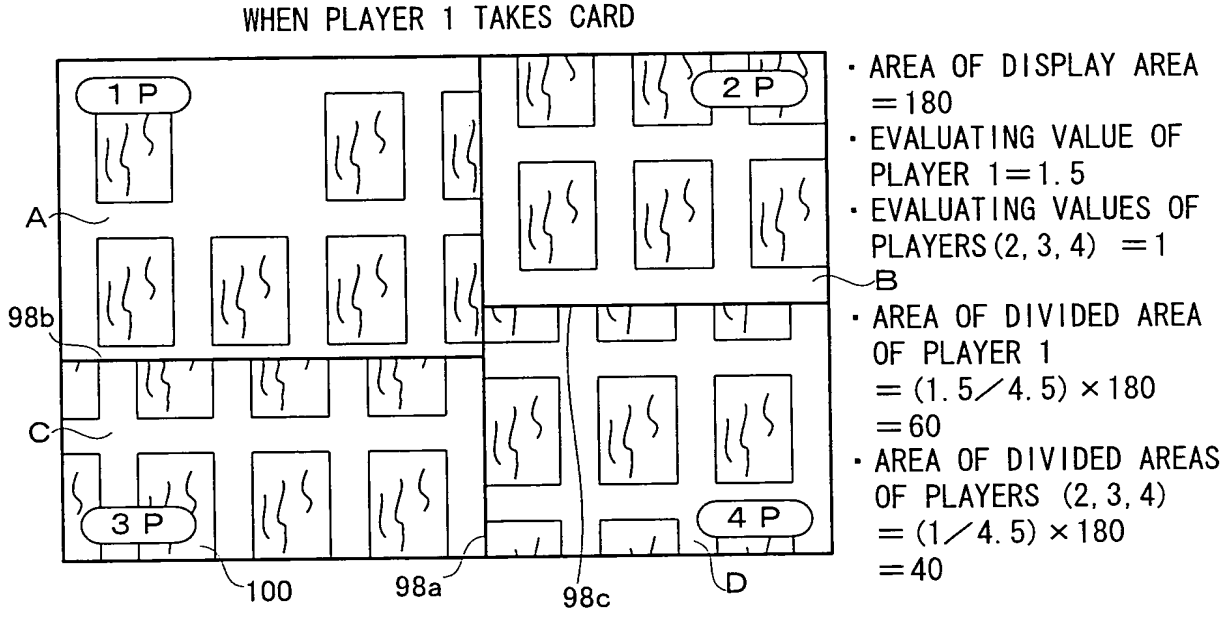
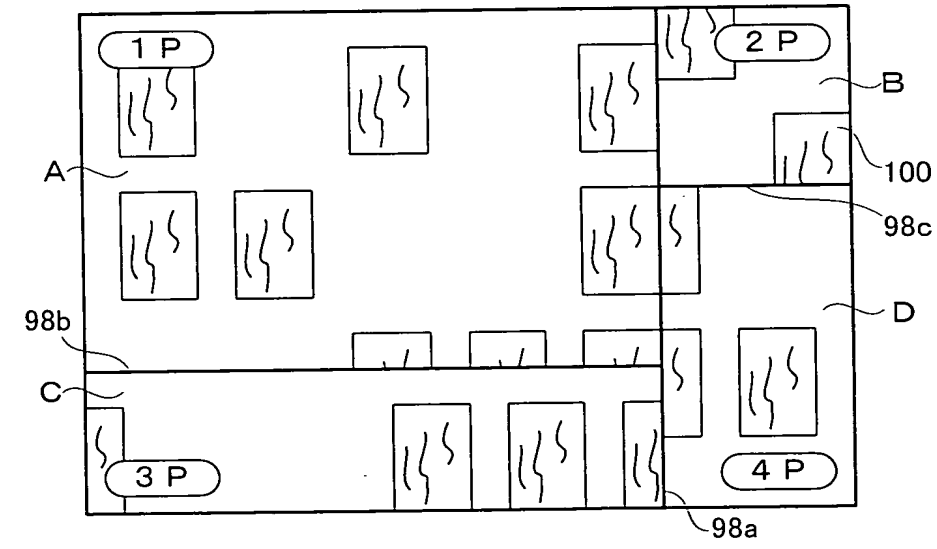


FIG. 9



Inventor: SHIMIZU
SN Unknown/Sheet 7 of 20
Atty. Dkt.: 723-1464

FIG. 10

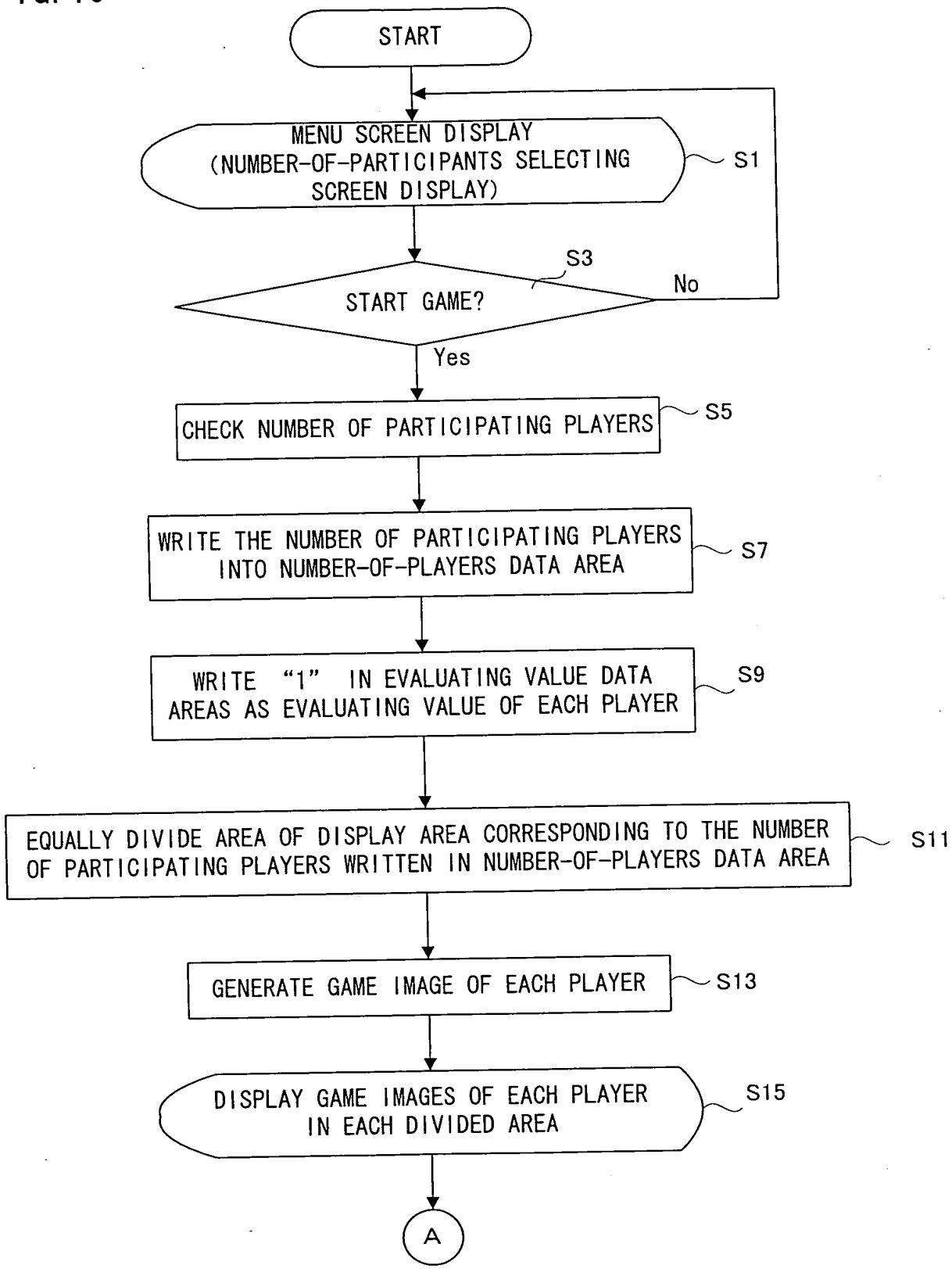
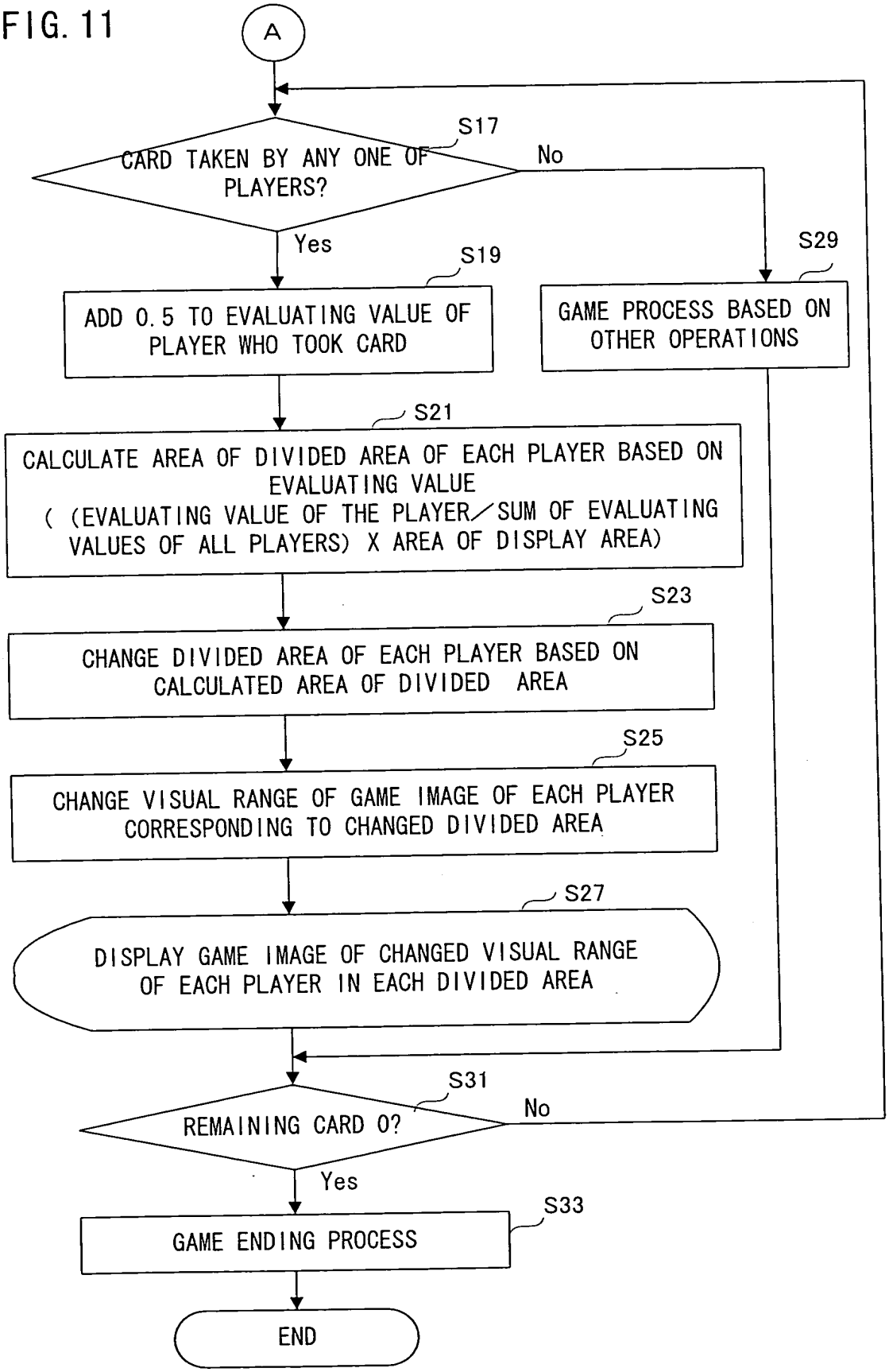


FIG. 11


A
S17
CARD TAKEN BY ANY ONE OF PLAYERS?
No
Yes
S19
ADD 0.5 TO EVALUATING VALUE OF PLAYER WHO TOOK CARD
S29
GAME PROCESS BASED ON OTHER OPERATIONS
S21
CALCULATE AREA OF DIVIDED AREA OF EACH PLAYER BASED ON EVALUATING VALUE
((EVALUATING VALUE OF THE PLAYER/SUM OF EVALUATING VALUES OF ALL PLAYERS) X AREA OF DISPLAY AREA)
S23
CHANGE DIVIDED AREA OF EACH PLAYER BASED ON CALCULATED AREA OF DIVIDED AREA
S25
CHANGE VISUAL RANGE OF GAME IMAGE OF EACH PLAYER CORRESPONDING TO CHANGED DIVIDED AREA
S27
DISPLAY GAME IMAGE OF CHANGED VISUAL RANGE OF EACH PLAYER IN EACH DIVIDED AREA
S31
REMAINING CARD 0?
No
Yes
S33
GAME ENDING PROCESS
END

Inventor: SHIMIZU
SN Unknown/Sheet 9 of 20
Atty. Dkt.: 723-1464

FIG. 12

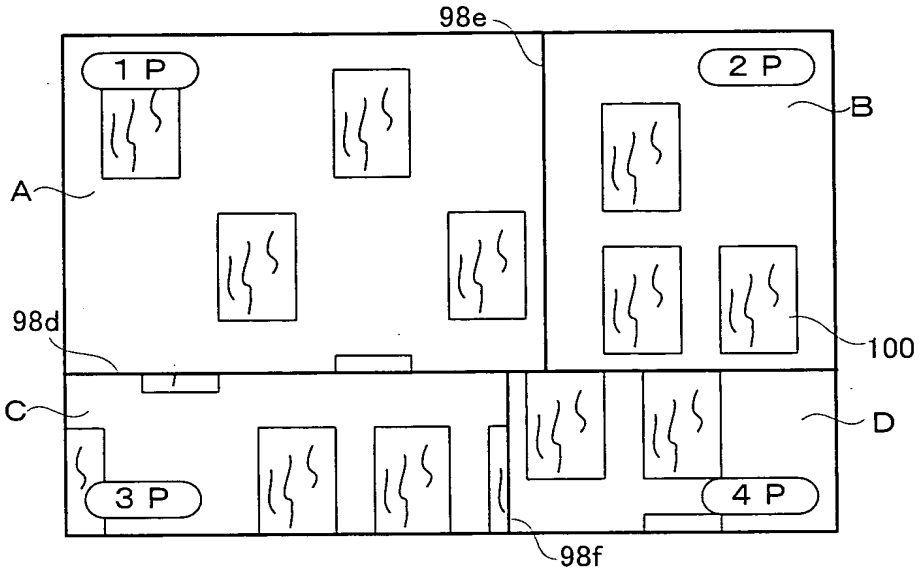
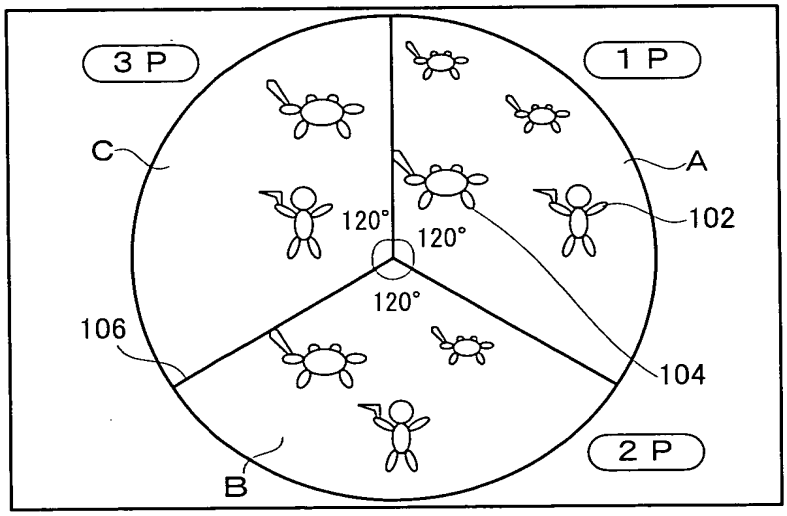


FIG. 13

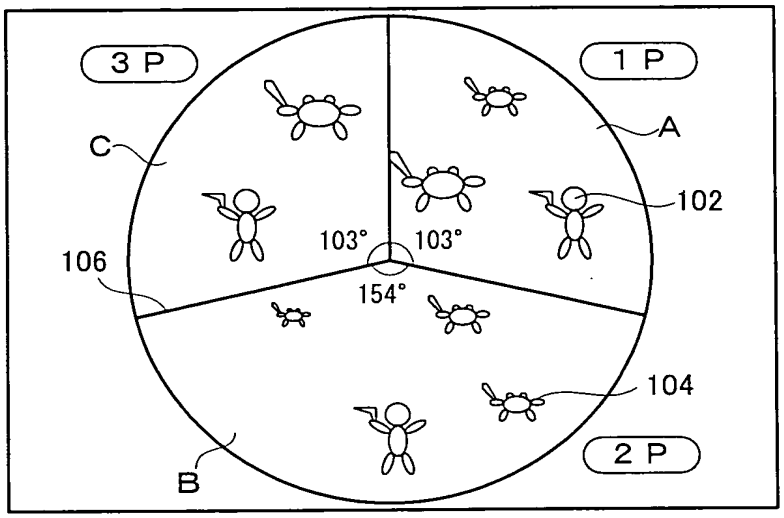
AT A TIME OF STARTING GAME (IN CASE OF 3-PERSON PLAY)



- EVALUATING VALUE OF PLAYERS (1, 2, 3) = 1
- CENTER ANGLE OF DIVIDED AREAS OF PLAYERS (1, 2, 3) = (1/3) × 360° = 120°

FIG. 14

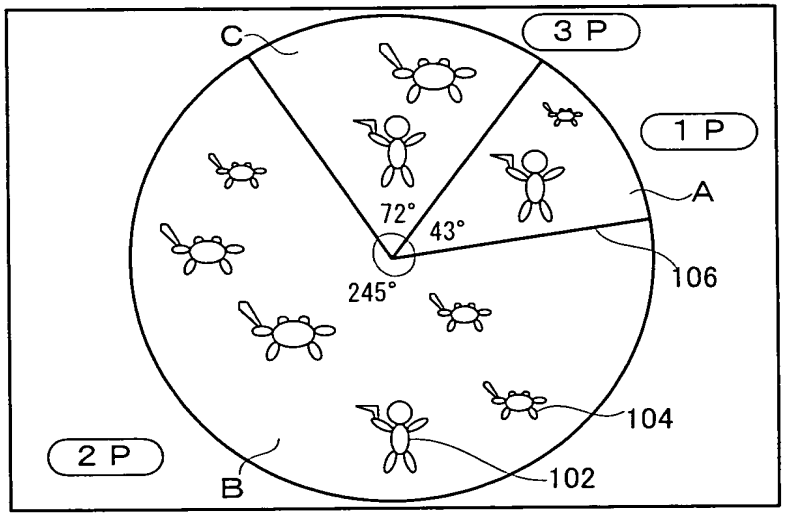
IN CASE THAT PLAYER 2 DEFEATS ENEMY



- EVALUATING VALUES OF PLAYERS (1, 3) = 1
- EVALUATING VALUE OF PLAYER 2 = 1.5
- CENTER ANGLE OF DIVIDED AREAS OF PLAYERS (1, 3)
  = (1 / 3.5) × 360°
  = APPROXIMATELY 103°
- CENTER ANGLE OF DIVIDED AREA OF P LAYER 2
  = (1.5 / 3.5) × 360°
  = APPROXIMATELY 154°

FIG. 15

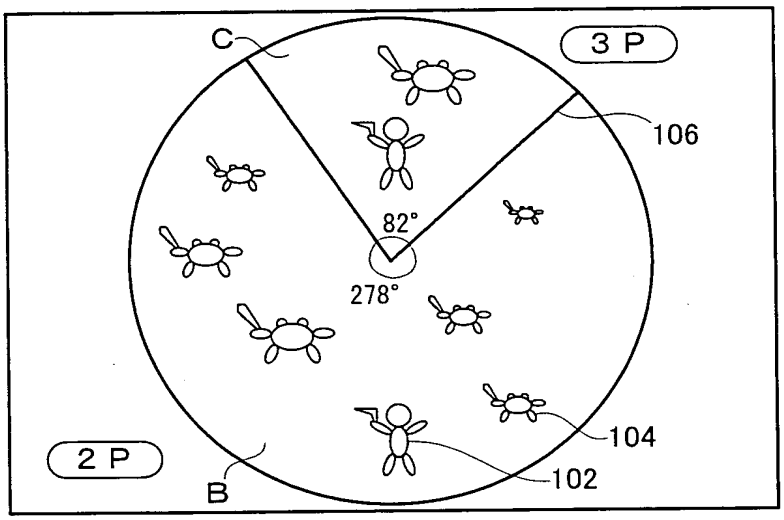
STATE IN WHICH PLAYER 2 FACILITATES GAME ADVANTAGEOUSLY



- EVALUATING VALUE OF PLAYER 1 = 3
- EVALUATING VALUE OF PLAYER 2 = 17
- EVALUATING VALUE OF PLAYER 3 = 5
- CENTER ANGLE OF PLAYER 1
  = (3 / 25) × 360°
  = APPROXIMATELY 43°
- CENTER ANGLE OF PLAYER 2
  = (17 / 25) × 360°
  = APPROXIMATELY 245°
- CENTER ANGLE OF PLAYER 3
  = (5 / 25) × 360°
  = 72°

FIG. 16

IN CASE PLAYER 1 IS GAME-OVER



- EVALUATING VALUE OF PLAYER 2=17
- EVALUATING VALUE OF PLAYER 3 =5
- CENTER ANGLE OF PLAYER 2
  =(17/22)×360°
  =APPROXIMATELY 278°
- CENTER ANGLE OF PLAYER 3
  =(5/22)×360°
  =APPROXIMATELY 82°

FIG. 17

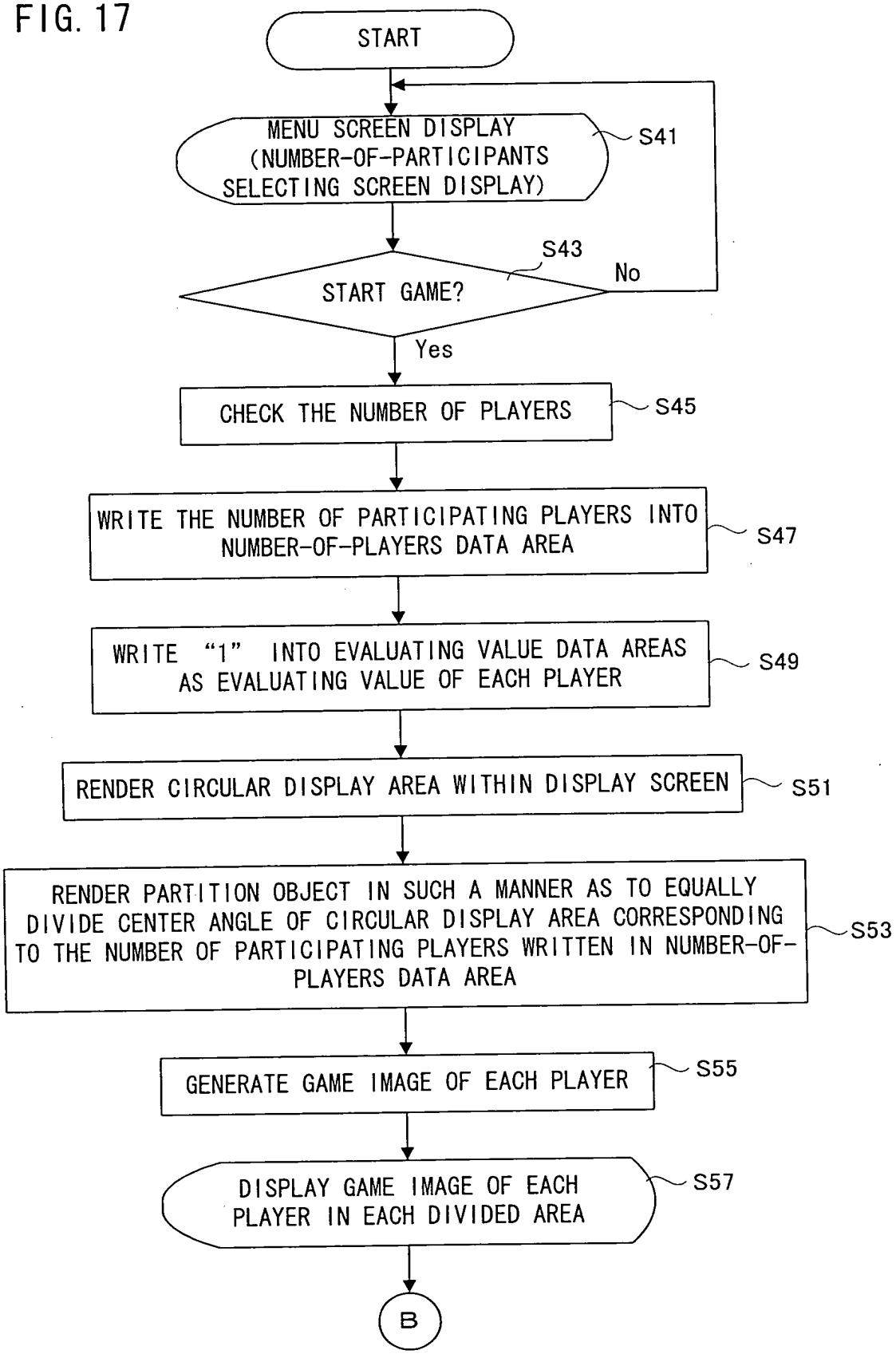

START
MENU SCREEN DISPLAY (NUMBER-OF-PARTICIPANTS SELECTING SCREEN DISPLAY)
S41
S43
START GAME?
No
Yes
CHECK THE NUMBER OF PLAYERS
S45
WRITE THE NUMBER OF PARTICIPATING PLAYERS INTO NUMBER-OF-PLAYERS DATA AREA
S47
WRITE "1" INTO EVALUATING VALUE DATA AREAS AS EVALUATING VALUE OF EACH PLAYER
S49
RENDER CIRCULAR DISPLAY AREA WITHIN DISPLAY SCREEN
S51
RENDER PARTITION OBJECT IN SUCH A MANNER AS TO EQUALLY DIVIDE CENTER ANGLE OF CIRCULAR DISPLAY AREA CORRESPONDING TO THE NUMBER OF PARTICIPATING PLAYERS WRITTEN IN NUMBER-OF-PLAYERS DATA AREA
S53
GENERATE GAME IMAGE OF EACH PLAYER
S55
DISPLAY GAME IMAGE OF EACH PLAYER IN EACH DIVIDED AREA
S57
B

FIG. 18

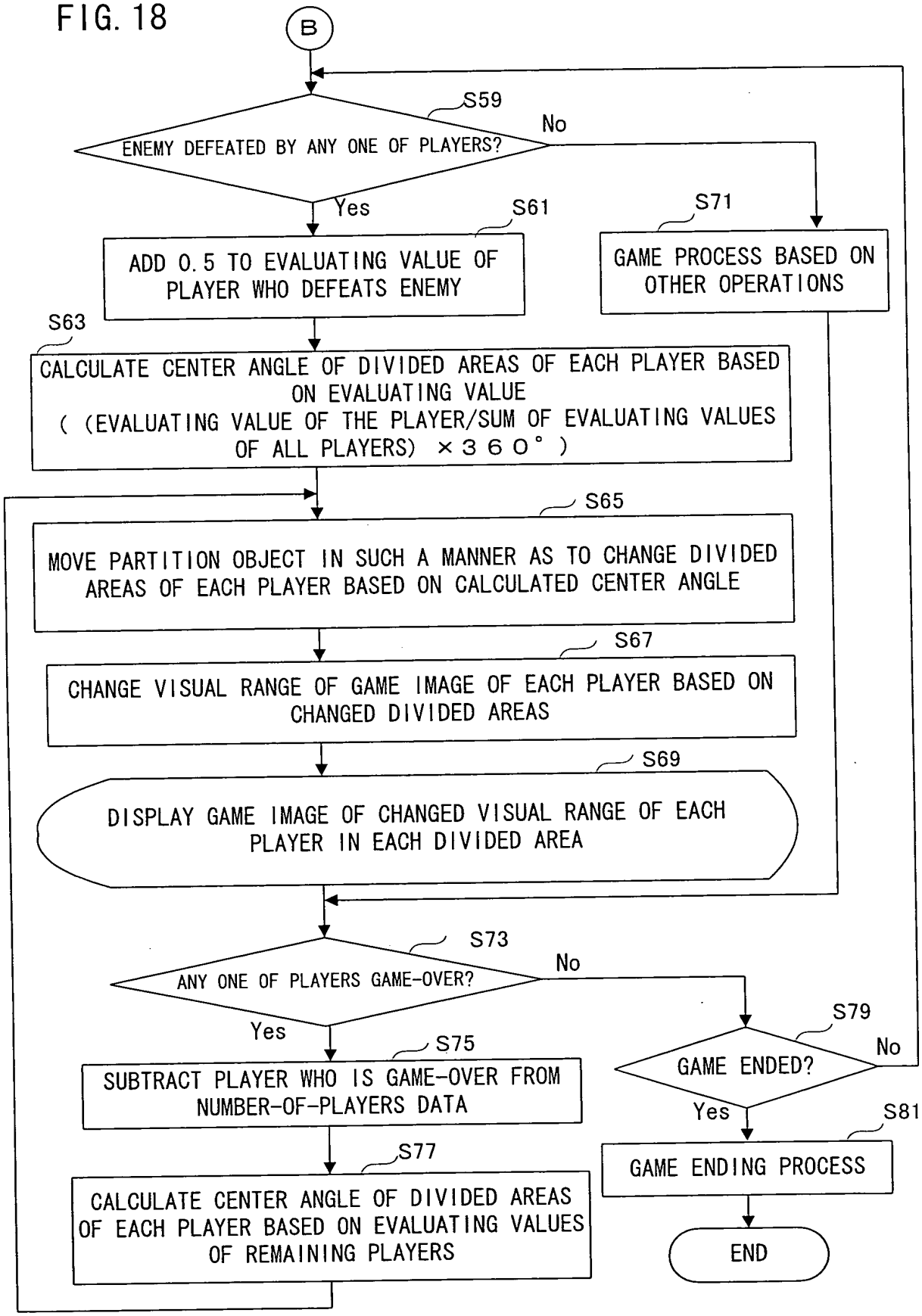

B
S59
ENEMY DEFEATED BY ANY ONE OF PLAYERS?
No
Yes
S61
ADD 0.5 TO EVALUATING VALUE OF PLAYER WHO DEFEATS ENEMY
S71
GAME PROCESS BASED ON OTHER OPERATIONS
S63
CALCULATE CENTER ANGLE OF DIVIDED AREAS OF EACH PLAYER BASED ON EVALUATING VALUE
((EVALUATING VALUE OF THE PLAYER/SUM OF EVALUATING VALUES OF ALL PLAYERS) ×360°)
S65
MOVE PARTITION OBJECT IN SUCH A MANNER AS TO CHANGE DIVIDED AREAS OF EACH PLAYER BASED ON CALCULATED CENTER ANGLE
S67
CHANGE VISUAL RANGE OF GAME IMAGE OF EACH PLAYER BASED ON CHANGED DIVIDED AREAS
S69
DISPLAY GAME IMAGE OF CHANGED VISUAL RANGE OF EACH PLAYER IN EACH DIVIDED AREA
S73
ANY ONE OF PLAYERS GAME-OVER?
No
Yes
S75
SUBTRACT PLAYER WHO IS GAME-OVER FROM NUMBER-OF-PLAYERS DATA
S77
CALCULATE CENTER ANGLE OF DIVIDED AREAS OF EACH PLAYER BASED ON EVALUATING VALUES OF REMAINING PLAYERS
S79
GAME ENDED?
No
Yes
S81
GAME ENDING PROCESS
END

FIG. 19

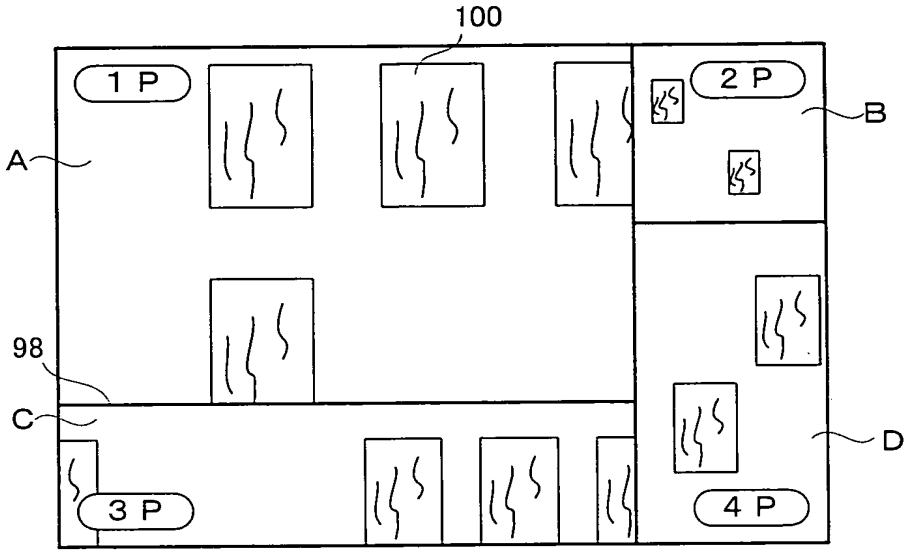


FIG. 20

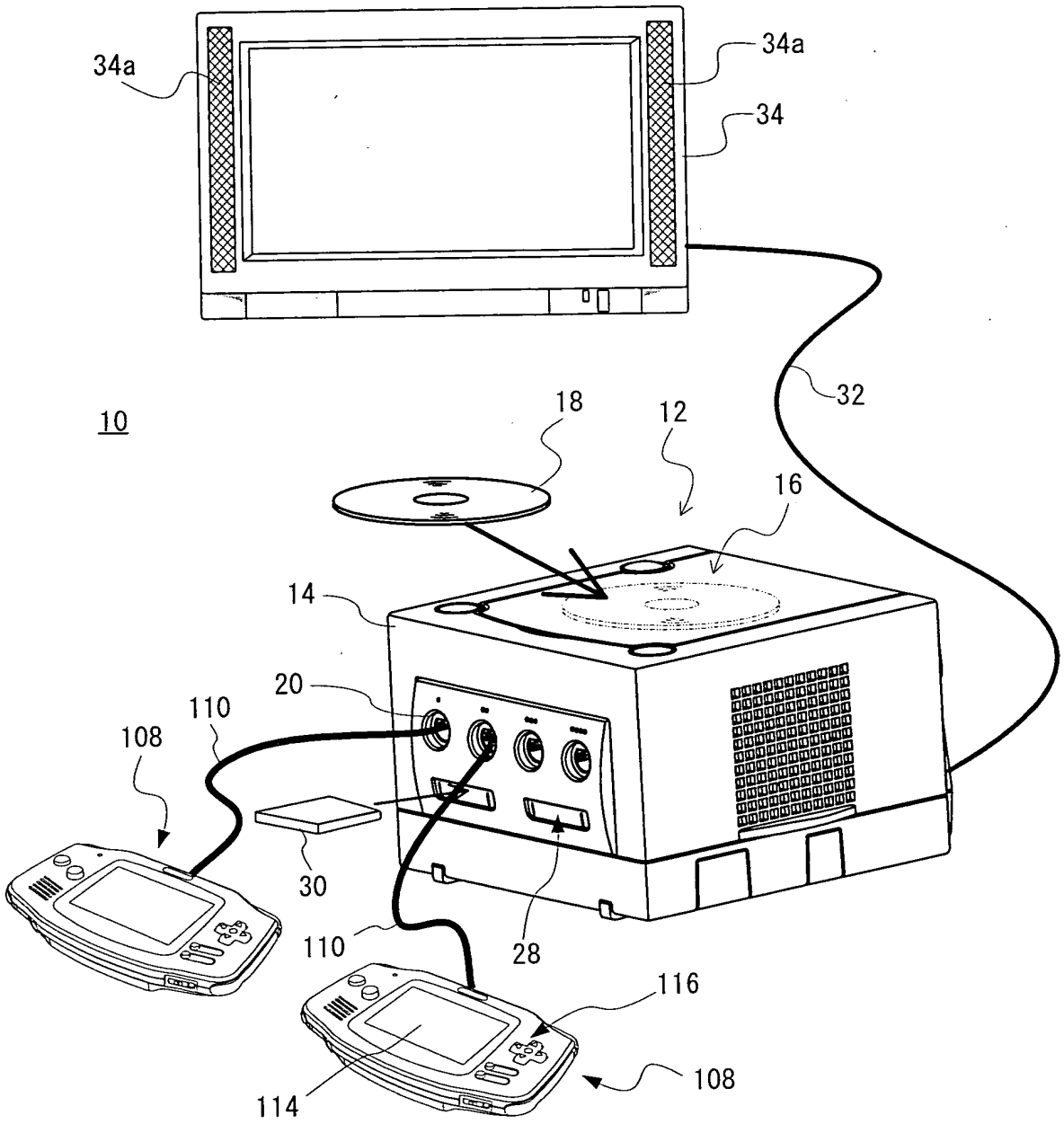


FIG. 21

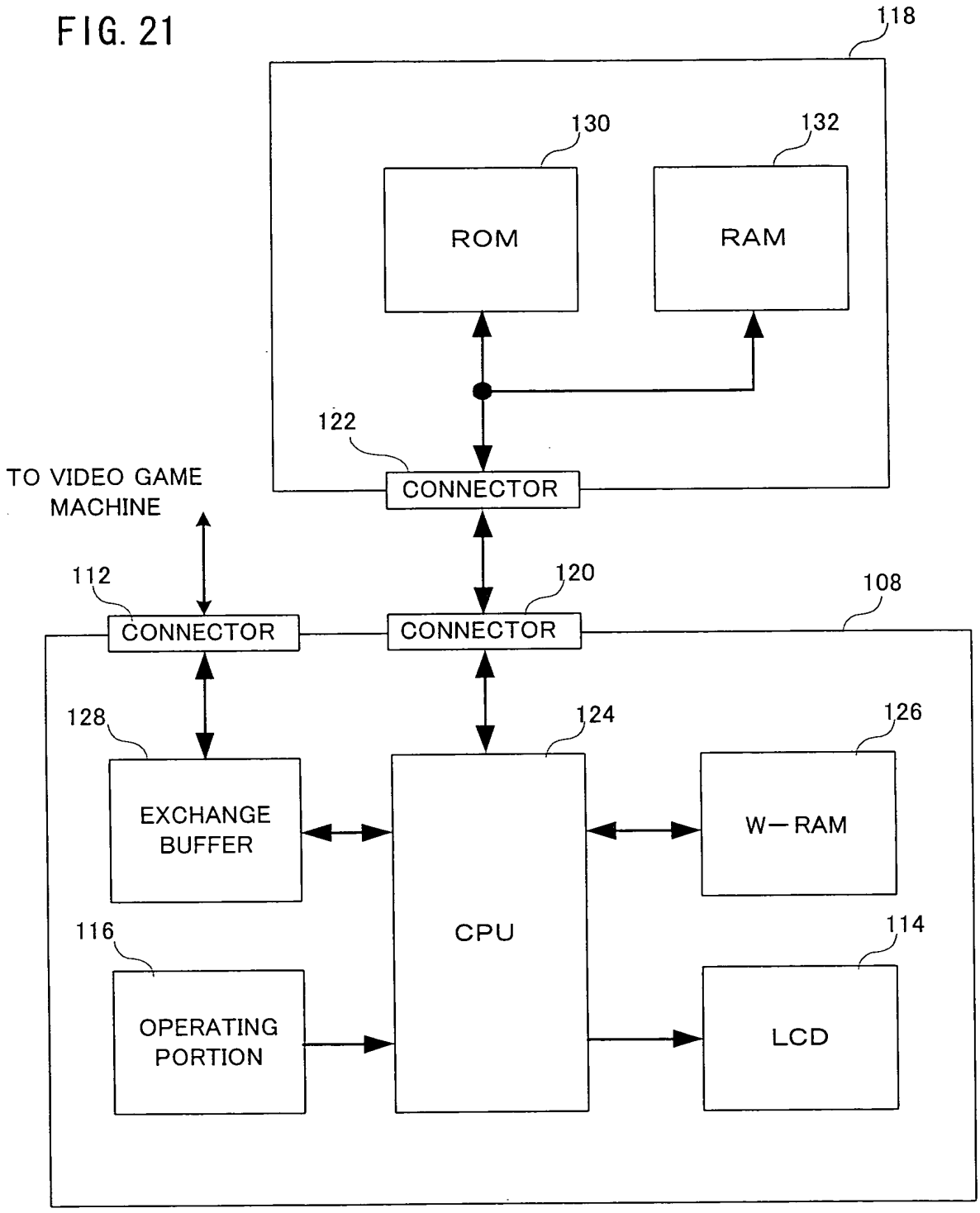

118
130
132
ROM
RAM
122
CONNECTOR
TO VIDEO GAME MACHINE
112
120
108
CONNECTOR
CONNECTOR
128
124
126
EXCHANGE BUFFER
CPU
W—RAM
116
114
OPERATING PORTION
LCD

FIG. 22

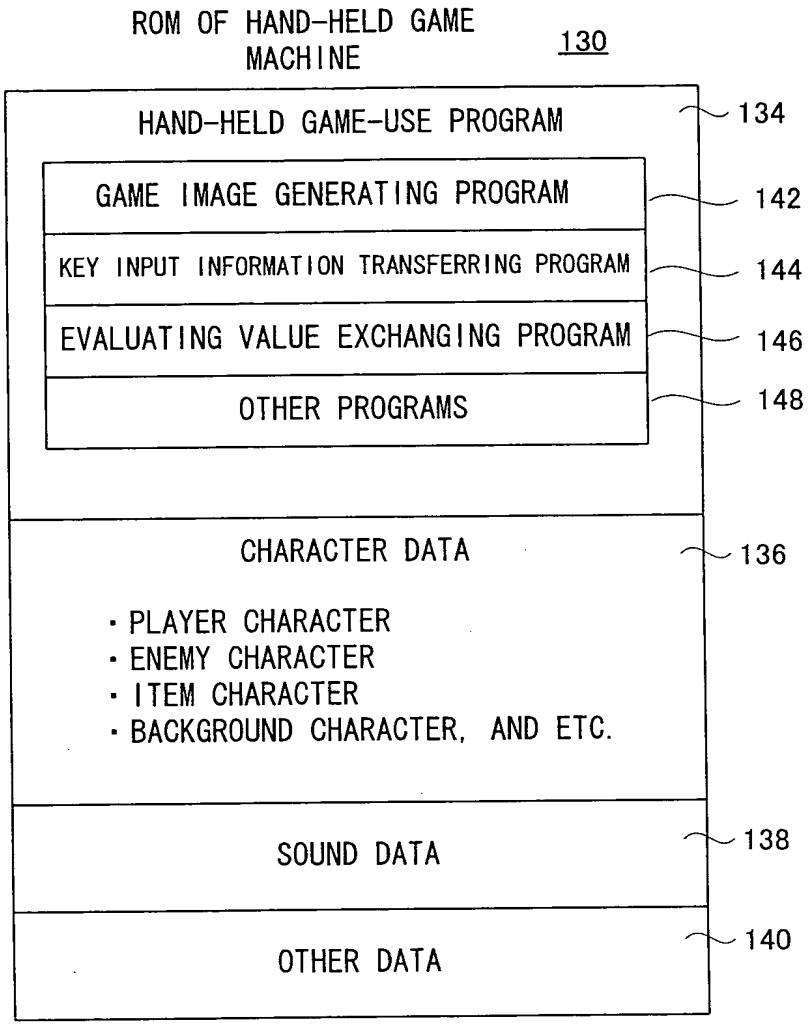
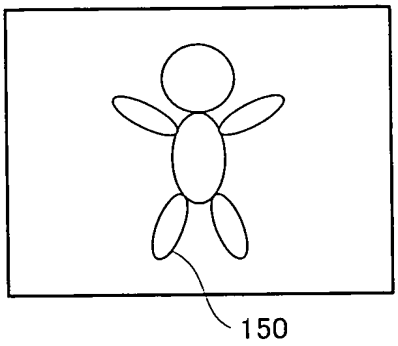

ROM OF HAND-HELD GAME MACHINE
130
HAND-HELD GAME-USE PROGRAM
134
GAME IMAGE GENERATING PROGRAM
142
KEY INPUT INFORMATION TRANSFERRING PROGRAM
144
EVALUATING VALUE EXCHANGING PROGRAM
146
OTHER PROGRAMS
148
CHARACTER DATA
136
・PLAYER CHARACTER
・ENEMY CHARACTER
・ITEM CHARACTER
・BACKGROUND CHARACTER, AND ETC.
SOUND DATA
138
OTHER DATA
140

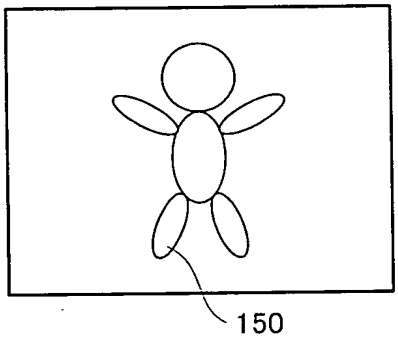
FIG. 23

(A) AT A TIME OF STARTING GAME

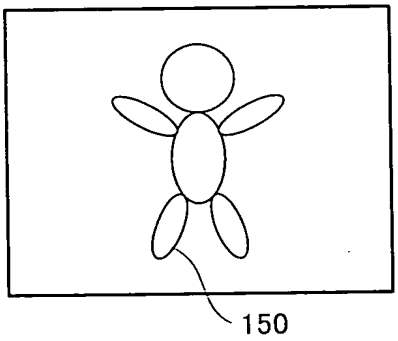
(a) HAND-HELD GAME MACHINE 1



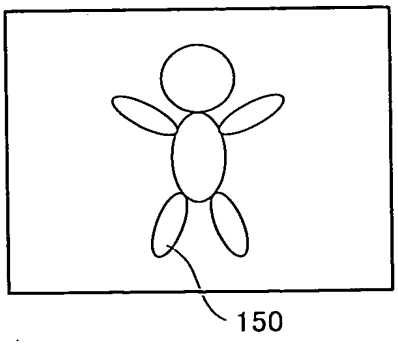
(b) HAND-HELD GAME MACHINE 2



(c) HAND-HELD GAME MACHINE 3

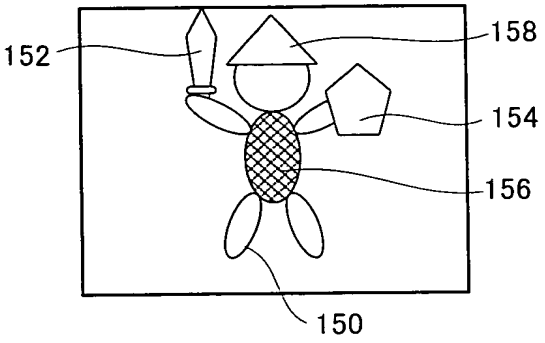


(d) HAND-HELD GAME MACHINE 4

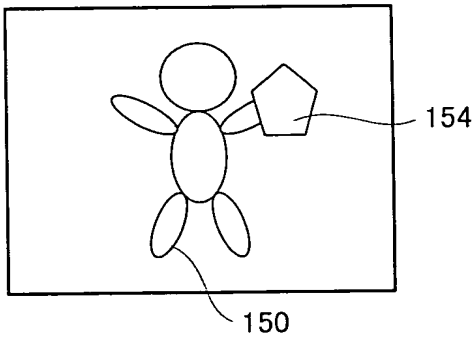


(B) STATE IN WHICH PLAYER 1 FACILITATES GAME ADVANTAGEOUSLY

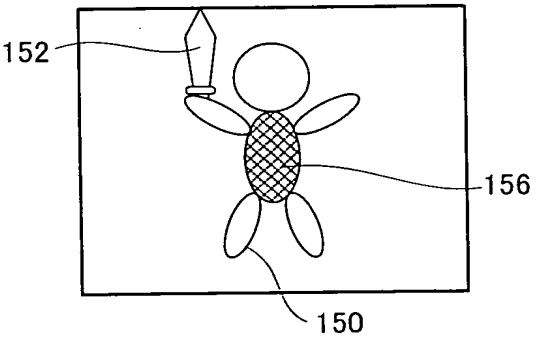
(a) HAND-HELD GAME MACHINE 1



(b) HAND-HELD GAME MACHINE 2



(c) HAND-HELD GAME MACHINE 3



(d) HAND-HELD GAME MACHINE 4

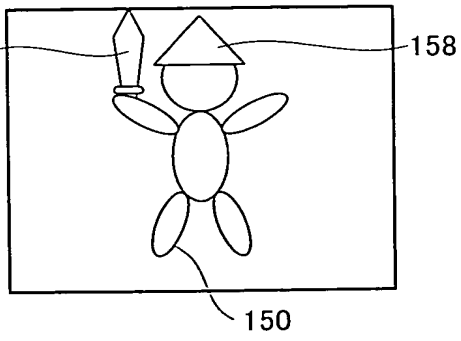


FIG. 24

EXCHANGING PROCESS ON VIDEO GAME MACHINE SIDE

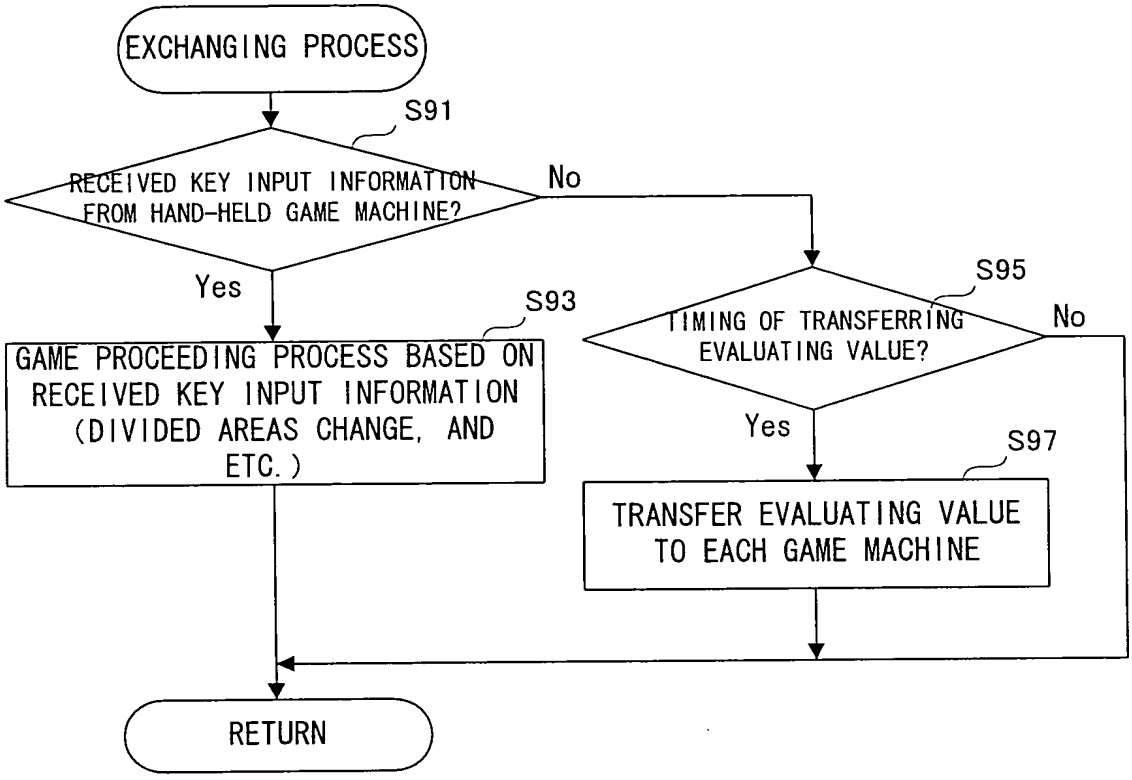
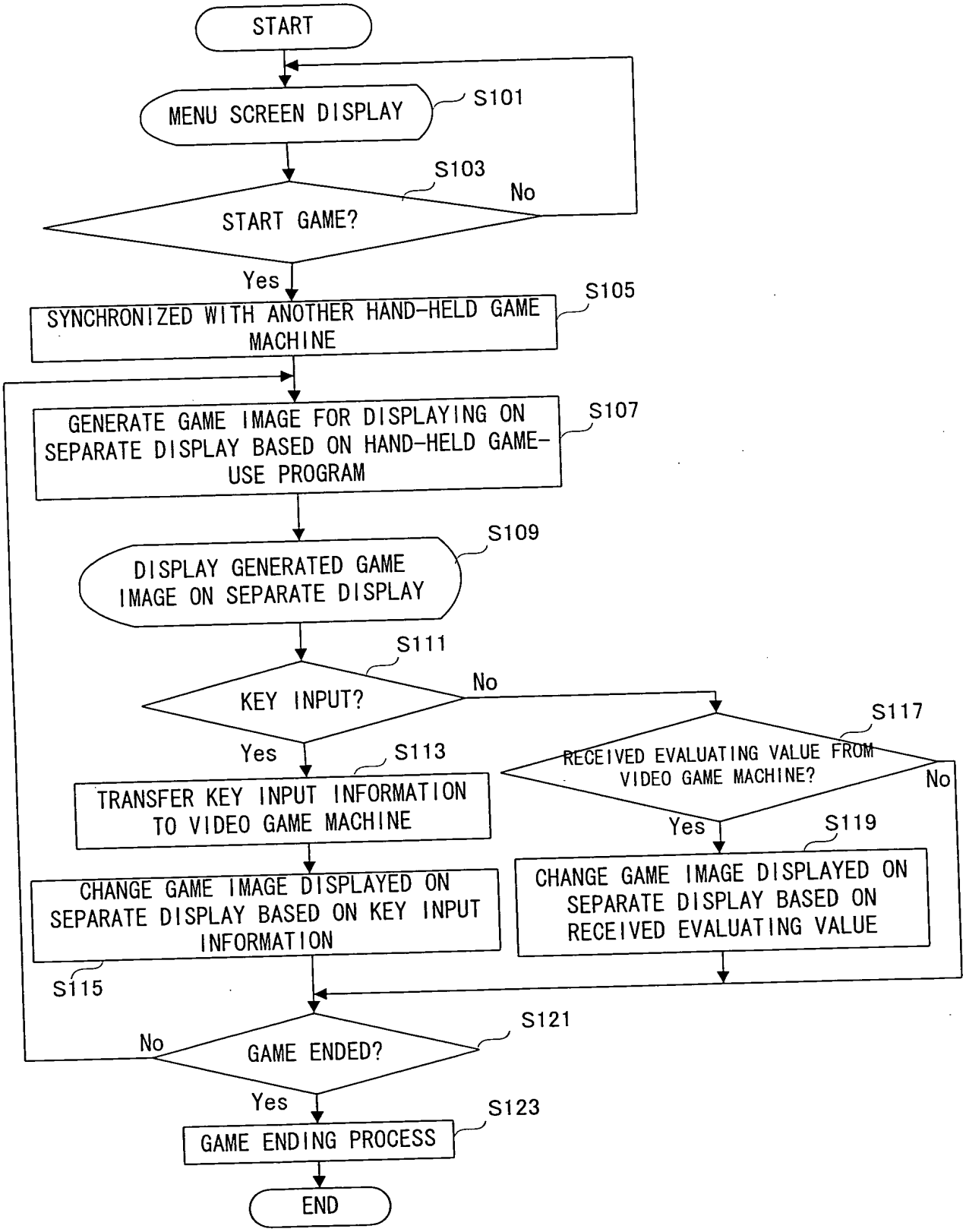


FIG. 25

PROCESS ON HAND-HELD GAME MACHINE SIDE